

Alg. 2 Warm Up #6-1

#1&2: Answer exact & simplified. No decimals.
#3 & 4: Approximate to nearest hundredth.

$$1) 2^{3x} = \left(\frac{1}{8}\right)^{4x-6}$$

$$2) 3^x \cdot 9 = 3^{6x}$$

$$3) 2^x = 5$$

$$4) \log_7\left(\frac{6}{x}\right) = \log_7 x + \log_7\left(\frac{x}{2}\right)$$

Test Practice, Tuesday space on your WU:

6-127. Ryan has the chickenpox! He was told that the number of pockmarks on his body would grow exponentially until his body overcomes the illness. He found that he had 60 pockmarks on November 1, and by November 3 the number had grown to 135. To find out when the first pockmark appeared, he will need to find the exponential function that will model the number of pockmarks based on the day.

Let x = time in days. $x = 1$ on Nov. 1

- Ryan decides to find the exponential function that passes through the points (3, 135) and (1, 60). Use these points to write the equation of his function of the form $f(x) = ab^x$.
- According to your model, what day did Ryan get his first chickenpox pockmark?

$$a) \begin{aligned} 60 &= ab^1 & \frac{135}{60} &= \frac{ab^3}{ab^1} & y &= 40(1.5)^x \end{aligned}$$

$$b) 1 = 40(1.5)^x$$

For your notebook if you don't already have it:



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Logarithm Properties

The following definitions and properties hold true for all positive $m \neq 1$.

Definition of logs: $\log_m(a) = n$ means $m^n = a$

Product Property: $\log_m(a \cdot b) = \log_m(a) + \log_m(b)$

Quotient Property: $\log_m\left(\frac{a}{b}\right) = \log_m(a) - \log_m(b)$

Power Property: $\log_m(a^n) = n \cdot \log_m(a)$

Inverse relationship: $\log_m(m)^n = n$ and $m^{\log_m(n)} = n$

HW Questions:

CL 6-148. Graph in three dimensions.

a. $(2, 3, 1)$

b. $(-2, 3, 0)$

c. $2x + y - z = 6$

CL 6-149. Determine the point of intersection of the three planes.

a. $\begin{cases} \textcircled{1} x + y + z = 3 \\ \textcircled{2} 2x - y + 2z = 6 \\ \textcircled{3} 3x + 2y - z = 13 \end{cases} \times (2)$

b. $\begin{cases} \textcircled{1} x + y + 4z = 5 \\ \textcircled{2} -2x + 2z = 3 \\ \textcircled{3} 3x + y - 2z = 0 \end{cases} \rightarrow (-1, 4, \frac{1}{2})$

Elim y

$\textcircled{1} + \textcircled{2} \rightarrow 3x + 3z = 9$

$\textcircled{3} + 2\textcircled{2} \rightarrow 4x - 2y + 4z = 12$
 $\quad \quad \quad 3x + 2y - z = 13$
 $\quad \quad \quad -1(7x + 3z = 25)$

$\textcircled{1} \quad 4 + y - 1 = 3$
 $\quad \quad y = 0$

$(4, 0, -1)$

$\begin{array}{r} 3x + 3z = 9 \\ -7x - 3z = -25 \\ \hline -4x = -16 \\ \hline x = 4 \end{array}$

$\begin{array}{r} 3(4) + 3z = 9 \\ -12 \quad \quad -12 \\ \hline 3z = -3 \\ \hline z = -1 \end{array}$

CL 6-150. The parabola $y = ax^2 + bx + c$ passes through the points (2, 3), (-1, 6), and (0, 3). Determine:

$c = 3$

a. The equation of the parabola. $\rightarrow y = ax^2 + bx + 3$

b. The vertex of the parabola.

from (2, 3)

c. The x -intercepts of the parabola.

$3 = a(2)^2 + b(2) + 3$

$0 = 4a + 2b$

then get a 2nd equation from (-1, 6) to find a & b .

$y = x^2 - 2x + 3$

$y = x^2 - 2x + \underline{1} + 3 - \underline{1}$

$y = (x - 1)^2 + 2$

Vertex (1, 2)

c) $0 = (x - 1)^2 + 2$

$\sqrt{-2} = \sqrt{(x - 1)^2}$

No x -int.

CL 6-151. Solve each equation to the nearest thousandth (0.001).

a. $2^x = 17$

c. $5(3^{x+1}) = 85$

b. $\frac{5x^3}{5} = \frac{75}{5}$

d. $\log_3(x+1) = -2$

$\sqrt[3]{x^3} = \sqrt[3]{15}$

$x \approx 2.466$

MATH

$3 \sqrt{\quad} 15$

$\sqrt[3]{\quad}$

15

\wedge

$(1 \div 3)$

y^x

enter

CL 6-151. Solve each equation to the nearest thousandth (0.001).

a. $2^x = 17$

b. $5x^3 = 75$

c. $\frac{5(3^{x+1})}{5} = \frac{85}{5}$

d. $\log_3(x+1) = -2$

$$3^{x+1} = 17$$

$$\log 3^{(x+1)} = \log 17$$

$$\frac{(x+1) \log 3}{\log 3} = \frac{\log 17}{\log 3}$$

$$x+1 = \frac{\log 17}{\log 3}$$

$$-1 \quad -1$$

$$x = \frac{\log 17}{\log 3} - 1, \text{ then calculate!}$$

$$3^{-2} = x+1$$

$$\frac{1}{9} = x+1$$

$$\frac{1}{9} - \frac{9}{9} = x$$

$$\boxed{-\frac{8}{9} = x}$$

CL 6-152. A gallon of propane costs \$3.59. Inflation has steadily increased 4% per year. 1.04 multiplier

a. What did a gallon of propane cost ten years ago? $\rightarrow x = -10$

b. If this trend continues, how much longer will it be until it costs \$10?

CL 6-153. Find the inverse of this equation: $y = 2 + \sqrt{2x - 4}$.

$$x = 2 + \sqrt{2y - 4}$$

$$(x - 2)^2 = (\sqrt{2y - 4})^2$$

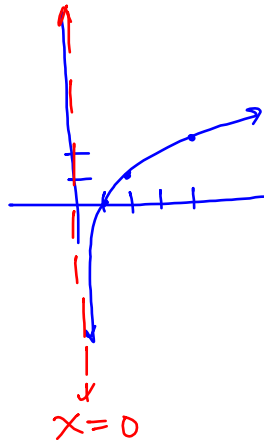
$$(x - 2)^2 = 2y - 4$$

CL 6-154. Use your Parent Graph Toolkit or make a table to graph $y = \log_2(x)$.

CL 6-155. Use your answer to the previous problem to graph $y = 1 + \log_2(x - 3)$. State the equation of the new asymptote and the new x -intercept.

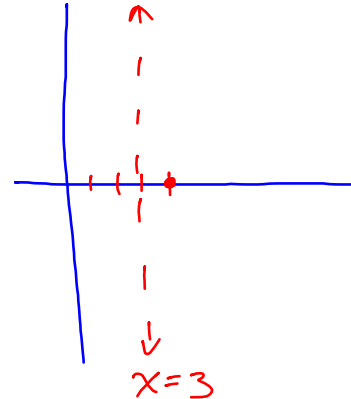
154) $y = \log_2 x$

x	y
1	0
2	1
4	2



155) $R+3, \text{ up } 1$

$R+3$	$\text{up } 1$
4	1
5	2
7	3



Test 6 will include:

Graph a point and equation in 3-D

Solve a system in 3 variables (by hand)

Find the equation of a parabola in standard form given three points

Change forms: $\log \longleftrightarrow \exp$.

Graph log using transformations of the parent graph

Write an equation, $y = ab^x$, given 2 points

Find an inverse

Solve an exponential equation

Simplify rational expressions

- 1) making the base match
- 2) using logs

Classwork:

Half sheet practice worksheet

- 1) solving a three variable system
- 2) simplifying a rational expression

Classwork:

Half sheet practice worksheet

1) 2) $y = ax^2 + bx + c$

① $7x - 4y - z = -1$ $(-1, -15) \rightarrow$

② $3x + 2y + 3z = 15$ $(2, -9) \rightarrow$

③ $x - y + z = -5$ $(4, -35) \rightarrow$

$(3, 6, -2)$

$y = -3x^2 + 5x - 7$

$$3) \frac{3x^3 - 12x}{x^2 + 7x + 10} \cdot \frac{x^2 + 4x - 5}{6x^2 - 12x}$$

$$\frac{3x(x^2 - 4)}{(x+5)(x+2)} \cdot \frac{(x+5)(x-1)}{6x(x-2)}$$

$$4) \frac{x(2x^2 - x - 3)}{x^2(2x^2 + 3x + 1)} \cdot \frac{(2x+1)}{3}$$

$$\frac{(2x-3)(x+1)}{x(2x+1)(x+1)} \cdot \frac{(2x+1)}{3}$$

HW:

Tan Review Worksheet

Test Ch. 6 tomorrow

Scientific calculators ok,
no graphers